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ABSTRACT

Short comments introduce each section of this bibliography designed to "introduce the teacher who wishes to do research in some aspects of change in science education to the relevant literature." The emphasis is on science education in England and Wales, but a large number of the entries are of United States origin and concern U. S. curriculum projects or research. Articles were not included in the bibliography unless they were research based or contained opinions which appear to have made a unique contribution to the literature. The following sections are included: guides to sources and bibliographies; models of analyses; methodology and statistics; comparative studies; general and recent references; general references for education in England; studies of change in education--multiple innovations; studies of change in science education, in special programs in education, in social studies education, and in humanities education. The section on multiple innovations is subdivided into historical and case studies; sources of innovation; strategies of development and dissemination; characteristics of innovation; adoption diffusion process; effects; and four sections on the receivers of the innovation: individuals, groups, institutions, and systems and geographic areas. (AL)

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Annotated Bibliography on Change in Education in England and America with an Emphasis on Science Education

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A Introduction

The purposes for producing this Bibliography are -

a. to introduce the teacher who wishes to do research in some aspect of change in science education to the relevant literature,

b. to provide a basis of sharing recent references of studies on change in education with interested research workers.

The initial emphasis is on science education in England and Wales since this Bibliography developed out of a research project on the adoption and diffusion of Nuffield science schemes in secondary schools. Future supplements will include studies of educational change in the humanities and social sciences.

References collected in other bibliographies, listed in section 1.3, have generally not been included in this Bibliography. The emphasis of this collection is on research studies. Articles which express only opinions on the subject are not included unless they make a unique contribution to the literature.

Interested persons are invited to communicate to the writer references they believe should be included and to comment on the following observations concerning research on change in education.

1. Since 1965 a large body of research on change in education has appeared in America - especially in the form of theses for the Ph.D. or Ed.D degree. This research is largely undocumented and unevaluated. Very few of the theses are listed in the bibliographies under section 1.3.

2. Results of over 100 theses listed in Dissertation Abstracts between 1965-70 are often contradictory partly as a result of the variety of concepts, research designs and statistical analyses used to study change in education. A review of this research is needed to define concepts, to identify valuable contributions and to outline minimum standards of research. The improved communications from such a document would contribute to the value of future research projects.

3. Research on change in education is often based on work in other disciplines. This sometimes results in a misapplication of concepts and statistical analyses. There is also evidence of a lag in methods where investigators in one field may have replaced one form of analysis with another but the old analysis will continue to be used in education for a number of years.

4. Developments in the use of computers for manipulation of data are still largely unavailable to the majority of teachers - as evidenced by the lack of use in published literature.

5. Studies of implementation of specific schemes in science education are just beginning to appear especially in the form of theses such as Kelly, Jenks and Yegge listed in sections 8.0, 8.6 and 8.7.

A basic list of readers with which to begin is listed below. The section in which the full reference information is provided is indicated in brackets.

Baron, G. 1970 (1.1)

Benne, K.D.; Bennis, W.G.; Chin, R. 1969 (5.0)

Cooper, J. 1967 (6.0)

Grobman, A.B. 1969 (8.0)

Gross, N.; Giacquinta, J.B.; Bernstein, M. 1968 (7.0)

Havelock, R.G. July, 1969 (1.3)

Jenkins, E.W. 1971 (8.5)

Jenks, H.C. 1968 (8.6)

Katz, M.B. 1971 (5.0)

Kelly, P.J. 1971 (4.0)

Kelly, P.J. 1972 (8.4)

Musgrove, F. 1971 (6.0)

Nie, N.H.; Bent, D.H.; Hull, C.H. 1970 (3.0)

Oettinger, A.G. 1969 (5.0)

Peterson, B.A. 1969 (7.8)

Schools Council Curriculum Bulletin 3, 1970 (6.0)

Taylor, P.H. 1970 (6.0)

Yegge, J.F.; Watson, F.G.; Winter, S.S. 1971 (8.7)

note - "ED" refers to an ERIC REPORT microfiche number

B Sources

1. guides to sources and bibliographies

1.0 statistical sources

In England the most convenient source of educational statistics is the Department of Education and Science (D.E.S.) and these are listed in Government Publications (71). Publication lists from the National Foundation for Educational Research (N.F.E.R.) and Schools Council should also be consulted. Havelock (70) has a useful appendix on major information sources on American education.

D.E.S. Statistics of Education. 1969, 6 volumes. London: H.M.S.O., 1971.

D.E.S. Education and Science in 1970. London: H.M.S.O., April 1971.

D.E.S. Statistics of Education Special Series 1 Survey of the Curriculum and Deployment of Teachers (secondary schools) 1965-66. Part I Teachers. London: H.M.S.O.

D.E.S. Statistics of Education Special Series 2 Survey of In-service Training of Teachers 1967. London: H.M.S.O. 1970.

The Education Authorities Directory and Annual 1971. School Government Publishing Company, Darby House, Bletchingley Road, Merstham, Surrey, England.

The Education Committees Yearbook 1971-72. Councils and Education Press, 10 Queen Anne Street, London, W1M 9LD.

Education Statistics 1969-70. The Institute of Municipal Treasurers and Accountants and Society of County Treasurers, 1 Buckingham Place, London, S.W.1, England.

Government Publications Sectional List No.2 Department of Education and Science. 1971 London: H.M.S.O., P.O. Box 569, SE1 9NH, or U.S.A.: Pendragon House, 899 Broadway Avenue, Redwood City, California 94063.

Harvey, Joan M. Sources of Statistics. London: Clive Bingley, 1969.

National Foundation for Educational Research in England and Wales, 2 Jennings Buildings, Thames Avenue, Windsor, Berkshire, SL4 1QS, England

Havelock, Ronald G. A Guide to Innovation in Education. Center for Research on Utilization of Scientific Knowledge, Institute for Social Research, The University of Michigan, Ann Arbor, Michigan, U.S.A. 1970. (A revised edition will be available mid 1972 from Educational Technology Publication Inc.)

Schools Council, 160 Great Portland Street, London, W1N 6LL, England.

1.1 bibliographical guides

Baron, George, A Bibliographical Guide to the English Educational System. 3rd ed. Athlone Press, 1970.

Bristow, Thelma; Holmes, Brian. Comparative Education Through the Literature. A Bibliographical Guide. London: Butterworths, 1968.

Burke, Arvid J.; Burke, Mary A. Documentation in Education. New York: Teachers College Press, Columbia University, 1967.

Butcher, H.J. ed. Educational Research in Britain. London: University Press, 1968.

Department of Education and Science Science Research in British Universities and Colleges 1969-70. Vol. III Social Sciences. London: H.M.S.O. 1970.

Foskett, D.J. How to Find Out: Educational Research. London: Pergamon Press 1965.

Higson, C.W.J. "Finding Out About Educational Research" Educational Research II 1968 31-37.

1.2 annual abstracts of articles and research

The following terms were used in the search of subject indices -

adoption
annotated bibliographies
bibliographies
communication
curriculum change
diffusion
educational change
educational innovation
innovation

	Volumes searched
British Education Index	Vol. 6 no. 1 - no. 6
Education Index	Vol. 16 - Vol. 19
ERIC Research in Education (Educational Resources Information Center)	Vol. 1 - Vol. 6 no. 9 (except Vol. 2 no.5 - no.7)
Index to Theses Accepted for Higher Degrees in the Universities of Great Britain and Ireland. London: ASLIB.	Vol. 10 - Vol. 18
Psychological Abstracts	not searched
Sociological Abstracts	Vol. 18 no. 5 - Vol. 19 no. 5
Dissertation Abstracts (University Microfilms)	Vol. 25 - Vol. 30

1.3 bibliographies of literature on change

Havelock (68) is the most useful bibliography with 17% of 4,000 references from education. Rogers (68) has nearly 300 references with 7% from education. Unfortunately many bibliographies fail to list microfiche number when documents are available in this form.

Center for Comparative Political Analysis. "Bibliography on planned Social Change - with Special Reference to Rural Development and Educational Development", unpublished report, University of Minnesota, January 1967. ERIC Report ED. 040 110.

Downey, Loren W. "Planned Change: A Selected Bibliography", unpublished report, Council for Educational Administration, University of Columbus, Ohio, 1968. ERIC Report ED. 020 569

Havelock, Ronald G. "Bibliography on Knowledge Utilization and Dissemination" 1968 ERIC Report ED. 029 172, and "A Comparative Study of the Literature on the Dissemination and Utilization of Scientific Knowledge", Center for Research on Utilization of Scientific Knowledge, Institute for Social Research, University of Michigan, July 1969 ED. 029 171.

Havelock, Ronald G. Major Work on Change in Education: An Annotated Bibliography with Author and Subject Indices. Institute for Social Research, University of Michigan, October 1969. This work is also included in Havelock 1970 listed in section 1.0.

Jones, Gwyn E. "The Adoption and Diffusion of Agricultural Practices", World Agricultural Economics and Rural Sociology Abstracts, 9: 3 September 1967 1-34.

Kurland, Norman; Miller, Richard I. "Selected and Annotated Bibliography on the Processes of Change", unpublished paper, 1966 ERIC Report ED. 023 025

Maguire, Louis M. "An annotated bibliography of the literature on change", Philadelphia: Research for Better Schools, Inc. 1970 ED. 043 965. A companion document is "Observations and analysis of the literature on change" ED. 043 066.

Paisley, William J. "Flow of (Behavioral) Science Information: A Review of the Research Literature", Institute for Communication Research, Stanford University, 1966. ERIC Report ED. 039 783.

Piele, Philip K. "Review of Recent Literature on Educational Diffusion Research" National Federation for the Improvement of Rural Education, October 1970. ED. 050 486.

Rogers, Everett M. Diffusion of Innovations. New York: The Free Press 1962.

Rogers, Everett M. "Supplement to Bibliography on the Diffusion of Innovations", unpublished report, Michigan State University, Department of Communication, 1968. ERIC Report ED. 030 056.

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Rogers, Everett M.; Smith, Leticia. Bibliography of the Diffusion of Innovations. East Lansing: Michigan State University, Department of Communication, Diffusion of Innovation Research Report No. 3, 1965.

Skelton, Gail J.; Hensel, J.W. "The change process in education. A selected and annotated bibliography" Center for Vocational and Technical Education, Ohio State University, 1970. ED. 041 108.

2. models of analysis

Models of analysis have become progressively more complex with their extension into processes over time and two way interaction. This change is related to a decline in influence of the research and development model and increase in the use of systems analysis. Of increasing influence are models based on social interaction and problem solving which emphasize the communication process and relation of an innovation with a particular context. Studies of innovativeness are beginning to consider varying contexts both in time and space and the particular identity of users and their social system. Few studies of curriculum innovation have attempted to place all events in the stages of initiation, development, diffusion, adoption and implementation within one model. One example is Kelly (71). Additional models are found in studies listed in other sections - especially Havelock, R.G. July 1969 (1.0) and Rogers, E.M. 1962 (1.3)

*

Brown, Lawrence A. "Diffusion Dynamics: A Review and Revision of the Quantitative Theory of the Spatial Diffusion of Innovation", unpublished Ph.D. thesis, Northwestern University, 1966. University Microfilm 66-13,958,

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Brown, Lawrence A. "Diffusion of Innovation: A Macroview", Economic Development and Cultural Change, 17:2 (January 1969) 189-211.

Coleman, Robert W. "Kurt Lewin's Theory of Social Change Applied to Curriculum Change". Unpublished Ed.D. thesis, University of Illinois, 1964. University Microfilm 65-3194.

Guba, Egon G. "Methodological Strategies for Educational Change". Unpublished report, November 8-10, 1965, ERIC Report ED. 011 404

Guba, Egon G. "The Place of Educational Research in Educational Change". Unpublished address to the Canadian Council for Research in Education, National Institute for the Study of Educational Change, June 8, 1967, ERIC Report ED. 028 496.

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* Bernhart, Irwin; Mackenzie, K.D. "Some problems in using diffusion models for new products". Pennsylvania State University, Department of Economics, 1970. ED 046 078.

3. methodology, statistics

Nie (70) as well as being a practical manual on the use of a unique computer programme has some of the most readable sections on correlation, multiple-regression, scalogram and factor analysis. An ideal companion book yet to be written would be a critical evaluation, with detailed examples, of actual studies of change in education stressing common errors of design and analysis. Lohnes (70) introduces statistics through the use of computers.

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Campbell, Donald T.; Stanley, J.C. Experimental and Quasi-Experimental Design for Research. Chicago: Rand McNally & Co., 1963.

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4. comparative studies

These references provide an introduction to literature on comparative education for studies including different cultures. Large, intensive and short term studies of change in schools by research teams from another country are just beginning to appear in the literature.

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Wassef, Wassef A. "A Comparative Analysis of Selected School Textbooks and Major Projects in Science Education in Four Countries in Relation to the Explosion of Scientific Knowledge", unpublished Ph.D. thesis, University of London Institute of Education, 1967.

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The following sources are a general introduction to literature representing the variety of fields relevant to, or in which studies of change have concepts useful to, education. These sources provide access to the considerable literature on social change.

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Becker, Marshall H. "Sociometric Location and Innovativeness: Reformulation and Extension of the Diffusion Model", American Sociological Review, 35:2 (April 1970) 267-83.

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Sewell, William H. "Rural Sociology Research, 1936-1965", Rural Sociology. 30:4 (December 1965) 428-451.

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6. general references for education in England.

Although there is little literature on diffusion of innovation in education there is considerable discussion on changes which are not directly relevant to American education. With the greater centralization of certain controls in education, topics on external examinations, finances and comprehensive education are subjects of innovation in themselves as well as being important to change in specific fields such as science education. In addition to the sources listed under 1.0, 1.1 and 1.2 the following are useful sources related to science education. Current sources may also be obtained from British publications in education especially The Times Educational Supplement and journals listed in 8.0.

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The classification of receivers or users of an innovation is based on the definition of unit of adoption used in this study. In education the most commonly used unit is the school in which "innovativeness" may be determined by a variety of methods such as nomination by panels or individuals or by "self-reported" use of a variety of innovations. Innovative schools or systems may be then compared by variables which are indicated by the following classification:

a. individual teacher variables - personality, attitudes, age, experience.

b. individual administrator variables (as in a. above) and administrative variables - finances, organizational characteristics.

c. pupil characteristics

d. combinations of a. - c.

e. system variables - community characteristics, government programmes.

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8. studies of change in science education

The earliest sources of information on curriculum development projects in England and America are the newsletters and bulletins published by the individual projects. Unfortunately the issues go out of print and most are not available on microfiche.

The most comprehensive guide to science curriculum projects, including mathematics and the social sciences, is edited by Lockard (70). The reader unfamiliar with American education may find it difficult to distinguish the more important projects within the 115 listed for the United States alone. By omitting projects which are obviously regional or instituted by a commercial interest this list becomes much smaller. By including only projects which produce curriculum materials for teachers and which have been the subject of at least five articles in teacher journals (reported in Lockard) the list narrows to 16 projects. Most of the following projects are known by their initials (given in brackets) in American education:

Anthropology Curriculum Study Project (ACSP)

Biological Sciences Curriculum Study (BSCS)

Chemical Educational Materials Study (CHEMS)

Conceptually Oriented Program in Elementary Science (COPES)

Earth Science Curriculum Project (ESCP)

Elementary Science Study (ESS)

Harvard Project Physics (HPP)

High School Geography Project of the Association of American Geographers (HSGP)

Idea Centered Laboratory Science (I-CLS)

Introductory Physical Science (IPS)

Minnesota Mathematics and Science Teaching Project (MINNEMAST)

Physical Science for Nonscience Students (PSNS)

Science-A Process Approach (AAAS)

Science Curriculum Improvement Study (SCIS)

Secondary School Science Project (SSSP)

Social Studies Curriculum Project (SSCP)

A few additional projects are no longer producing materials, such as Chemical Bond Approach (CBA) and Physical Science Study Committee Physics (PSSC). The above list includes most of the national projects which are likely to have an influence on science teaching in America. Local projects are quite likely to have more influence in their area but are not considered in this bibliography. In England most of the curriculum development has been financed by the Nuffield Foundation and the Schools Council. Much of the materials which appear in project newsletters is published within a short time in science education journals. Reading through these journals gives one aspect of an historical account of the initiation, development, diffusion and implementation of a particular scheme.

For schemes under the Nuffield Project most articles appear beginning in 1965 in five journals.

Education in Chemistry

Education in Science

Journal of Biological Education

Physics Education

The School Science Review

The British Council publication Science Education Newsletter begun in 1967 is also a valuable source (available from the Science Department, The British Council, 59 New Oxford Street, London, WC1A 1BP)

For American sources, most of the projects listed by Lockard give a list of published articles which indicates the relevant journals to read. Few of the projects have produced a bibliography such as BSCS or AAAS which are available directly. Most of the bibliographies available in science education have been produced by ERIC.

In this Bibliography sources concern the entire process of science curriculum innovation or which focus on the process of change in quantitative or case studies are emphasized. These studies often have a comparative aspect in which the new scheme is compared with an old scheme. The adopting unit may be an individual teacher, a school, a school system or Local Education Authority, a geographical area or an entire country. A large number of articles published may describe important aspects of a project which affect adoption. Examples are Studies which evaluate the effectiveness of a single scheme, e.g. what pupils learn, or which describe historical aspects of the project or events leading up to initiation. These articles are usually included in the bibliographies of studies of the adoption of a particular scheme. In this Bibliography recent articles relating to science education in England are emphasized.

When the name of a specific project is not evident in the title the initials of specific projects are included in brackets.

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